JOINT STRIKE FIGHTER
the next generation strike fighter

Precision Strike Association
JSF Status

20 April 2004

Major General Jack Hudson, USAF
Program Executive Officer, Joint Strike Fighter Program Office

Mr. Tom Burbage, Lockheed Martin
Executive Vice President, General Manager, Joint Strike Fighter

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

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VISION

BE THE MODEL ACQUISITION PROGRAM FOR JOINT SERVICE AND INTERNATIONAL COOPERATION

DEVELOP AND PRODUCE AN AFFORDABLE NEXT GENERATION STRIKE FIGHTER WEAPON SYSTEM AND SUSTAIN IT WORLDWIDE

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

JSF is a Multi-Service, Global Program

F-35A

CTOL
(USAF)

F-35B

STOVL
(USMC and UK)

F-35C

CV
(USN)

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

Key Performance Parameters

USMC ★ USN ★ Joint ★

KPP	USMC	USAF	USN
Radio Frequency Signature	Very Low Observable		
Combat Radius	450 nm USMC Profile	590 nm USAF Profile	600 nm USN Profile
Sortie Generation	4 Surg / 3 Sust	3 Surg / 2 Sust	3 Surg / 2 Sust
Logistics Footprint	< 8 C-17 equivalent loads (20 PAA)	< 8 C-17 equivalent loads (24 PAA)	< 46,000 cu ft 243 ST
Mission Reliability	95%	93%	95%
Interoperability	Meet 100% of critical, top-level Information Exchange Requirements Secure Voice and Data		
STOVL Mission Performance		N/A	N/A
Short Take-Off Distance	550’		
Vertical Lift Bring Back	2 x 1K JDAM, 2 x AIM-120 With Reserve Fuel		
Maximum Approach Speed	N/A	N/A	145 knots

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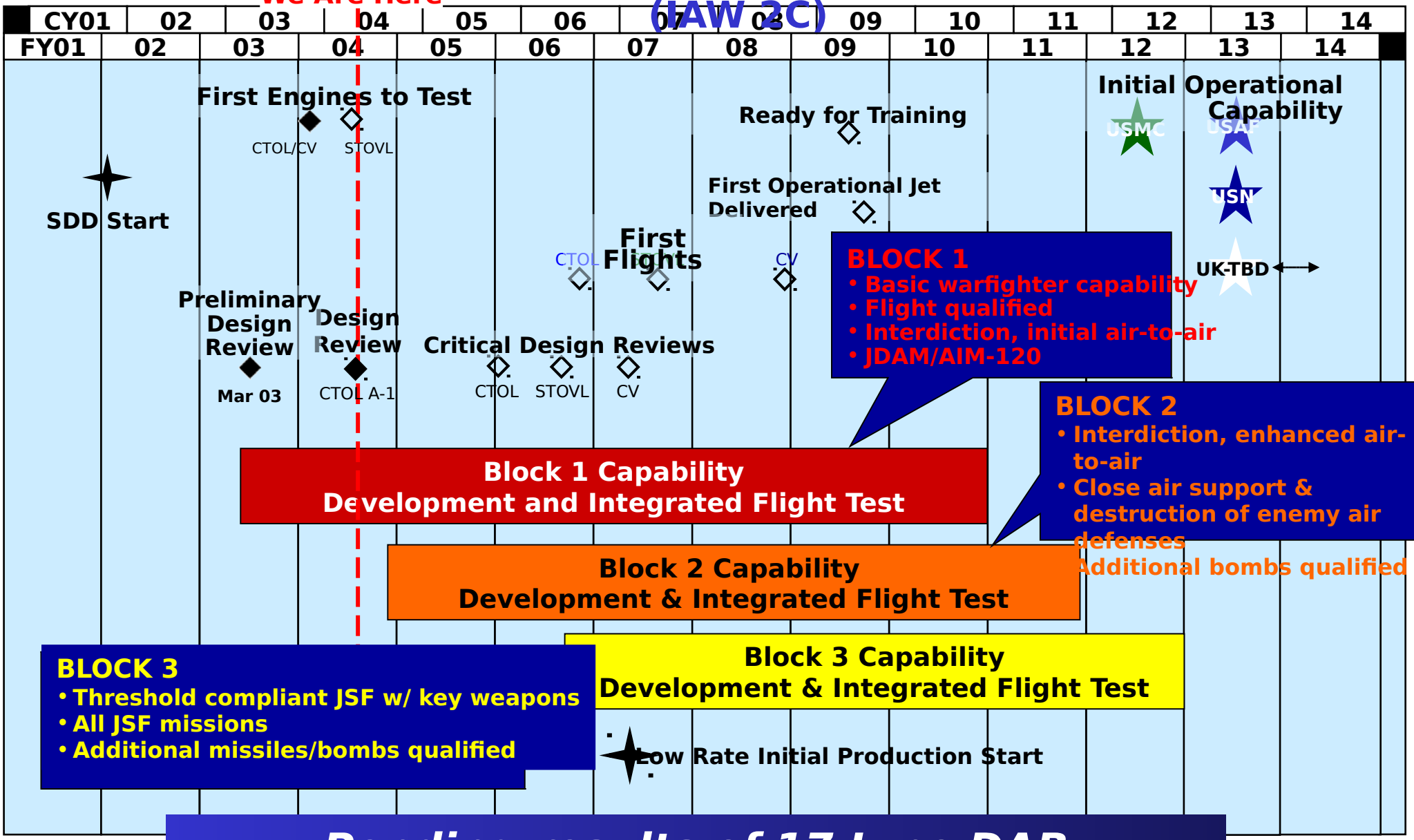
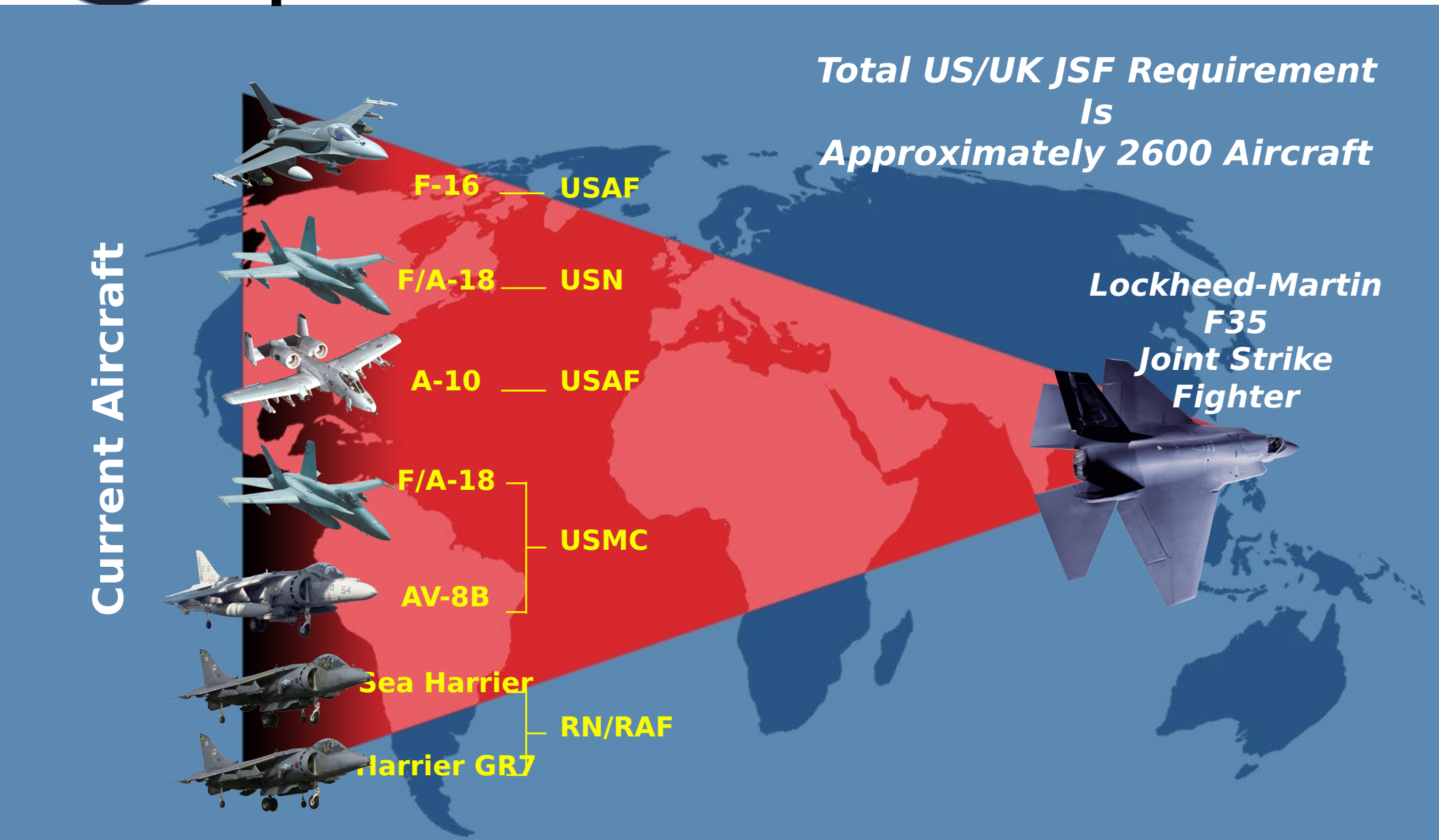
Replanned System Development and Demonstration (SDD) Schedule



DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

JSF Enables True Joint, Coalition Operations



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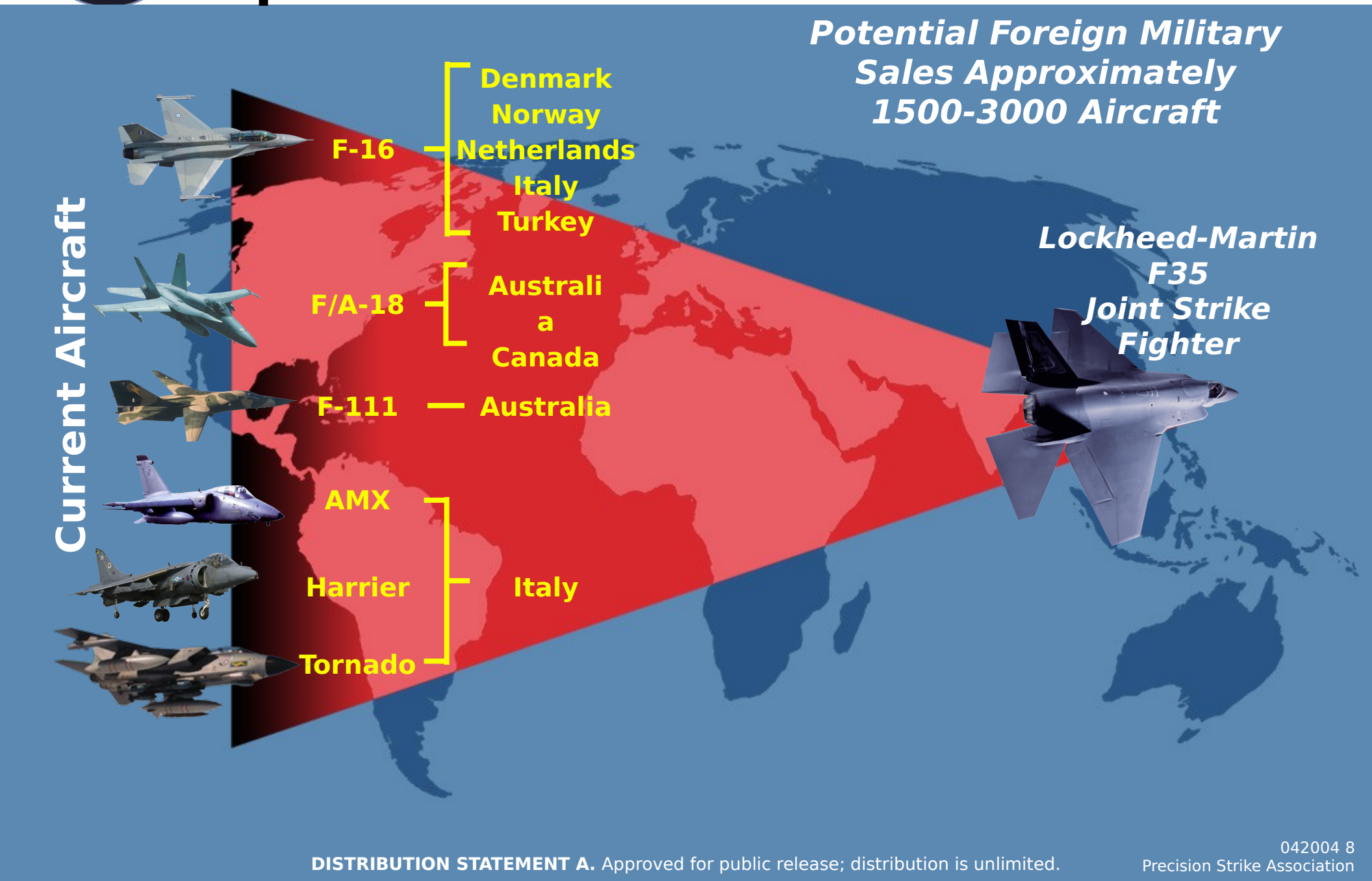
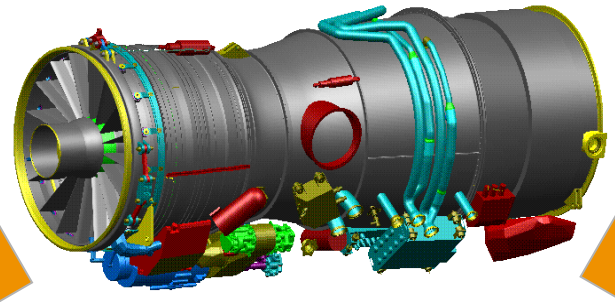
JSF Enables True Joint, Coalition Operations



DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

Engine Interchangeability… Either Engine in any of the Three Aircraft Variants

F135 or F136



CTOL

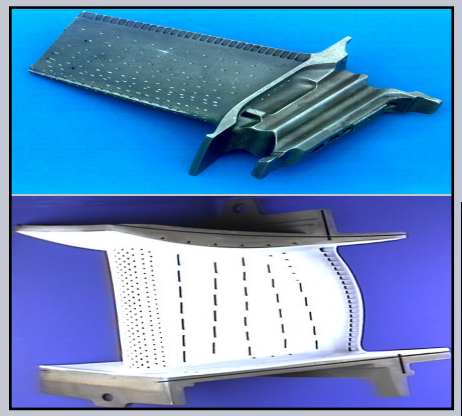
CV

STOVL

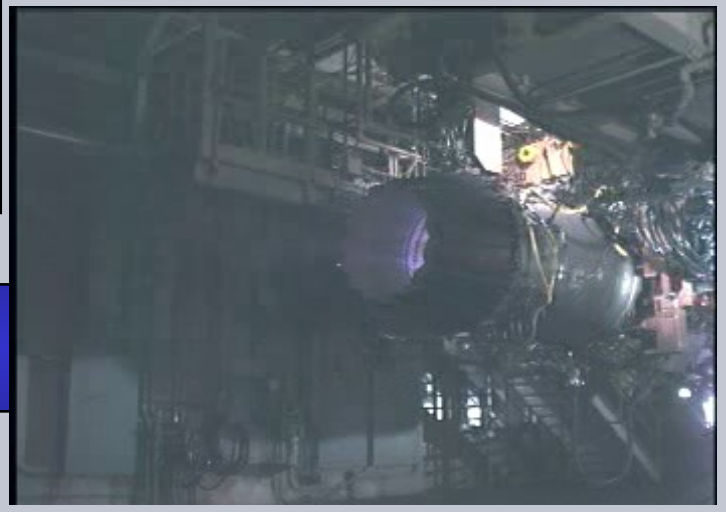
DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

F135 Propulsion System

2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011



Parts Manufacturing



Engine Test
12 Engines

Low Rate Initial Production (LRIP)

Flight Test
20 Engines

Business Opportunity

Defense Capability

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

Variants

450-600 nm Range

1.6 Max Mach (Limit)

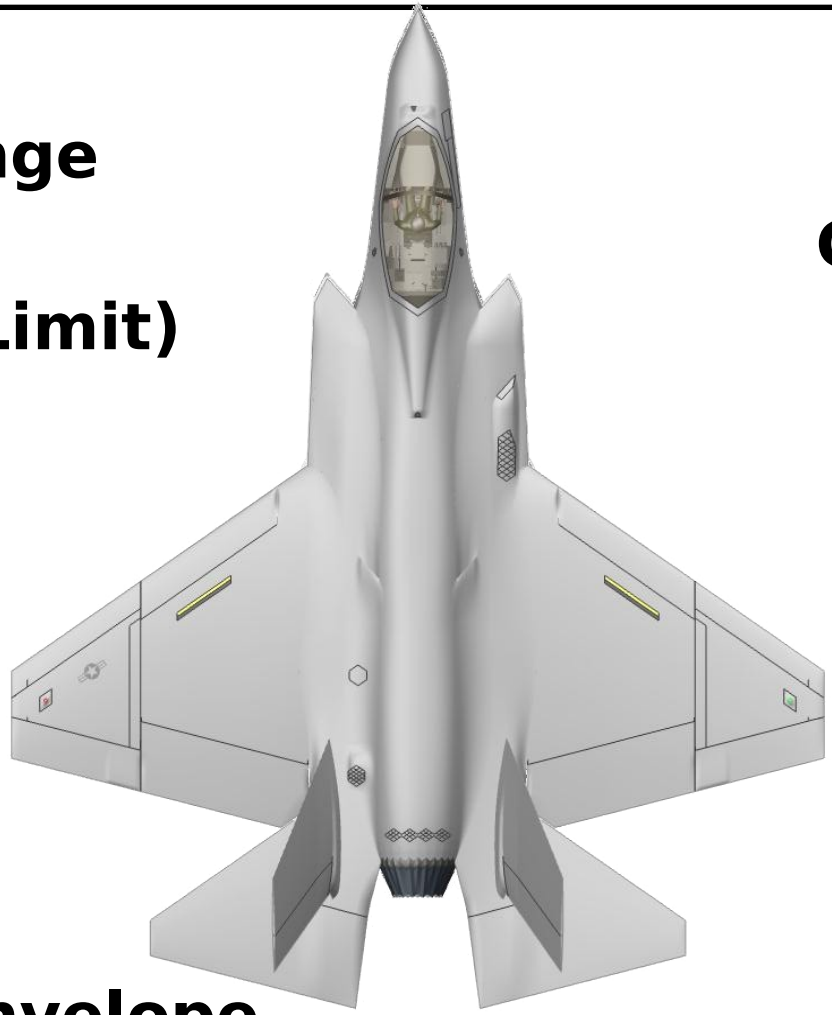
Stealthy

Same Weapons

Same Avionics

Similar Flight Envelope

Same Basic Engine



Conventional Takeoff / Landing (CTOL)

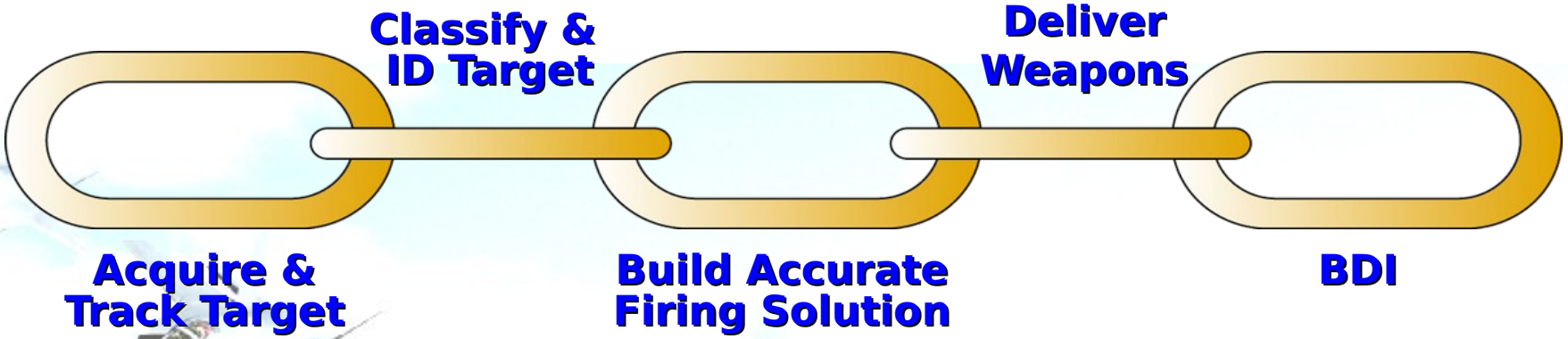
Carrier Operations (CV)

Short or Vertical Takeoff / Landing (STOVL)

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

JSF Lethality

Lethality Kill Chain: Must Forge *Every Link* to Kill Target



JSF Lethality Features

- **Acquire and Track Target:**
  - Long Range Radar, Big SAR, Enhanced EOTS, IRST, GMTI, ESM, Interoperability
- **ID Target:**
  - High Resolution SAR, Enhanced EOTS, ESM, Interoperability
- **Build Accurate Firing Solution:**
  - Autonomous Targeting, Multiple Techniques to Improve TLE, Georegistration
- **Deliver Weapons:**
  - Range Enhancements, Versatile Weapon Carriage
- **Common BDI:**
  - Enhanced EOTS, ESM, High Resolution SAR

DISTRIBUTION STATEMENT A: Approved for public release; distribution is unlimited.

JSF Transformational Capabilities

Replacing Separate Service/Allied, Multi-Role Combat Aircraft With a Joint Service, Coalition System With the Following Capabilities:

- Long Range Stealth From Flexible Bases
- Multi-Spectral Sensor Suite to Find, Identify and Target Moving/Relocatable Targets Through Adverse Weather
- Integration and Interoperability Adding to Precision Strike
- Radical Reductions in Support Requirements and Ownership Costs

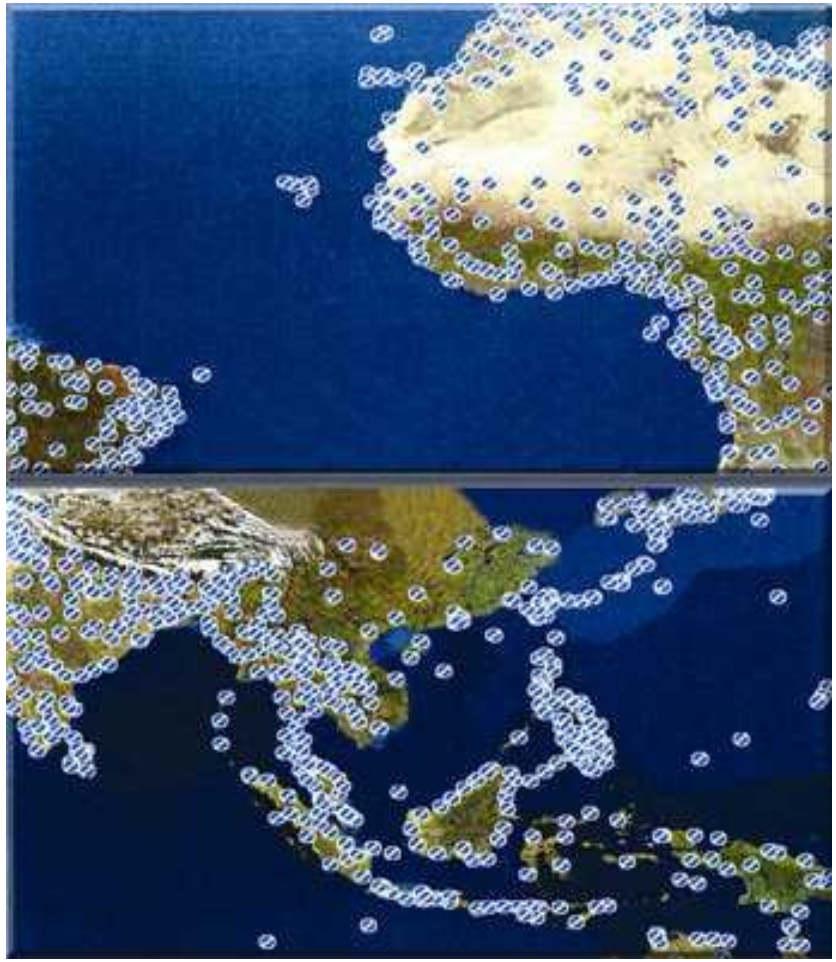
Transforming From Service-Focused Acquisition to Joint/Coalition Acquisition

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

Expeditionary / Versatile Basing Flexibility

Reduced Support Required (All JSFs)

Numerous Forward Operating Bases



Naval Access (CV, STOVL)

Austere Basing Option (STOVL)

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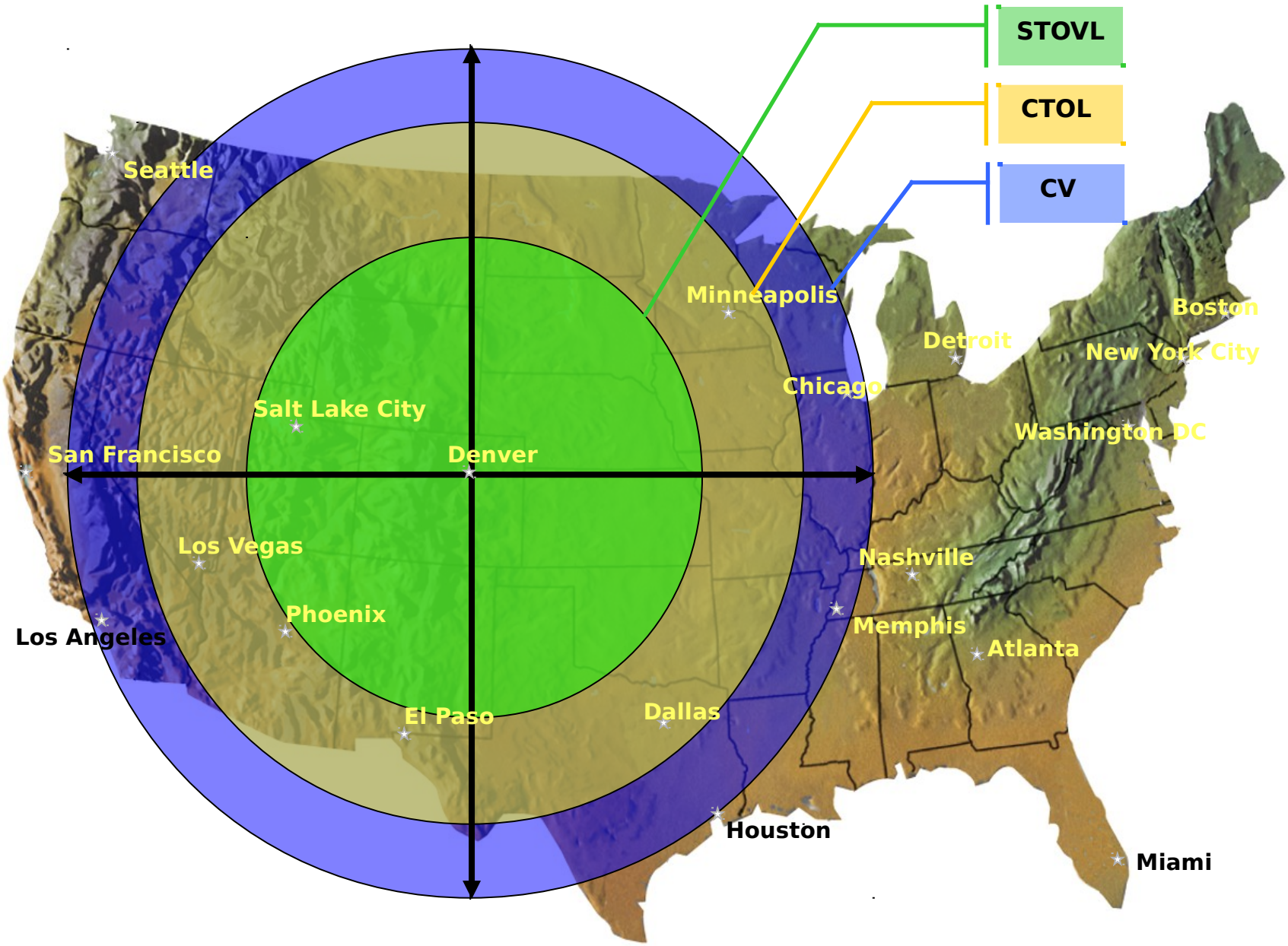
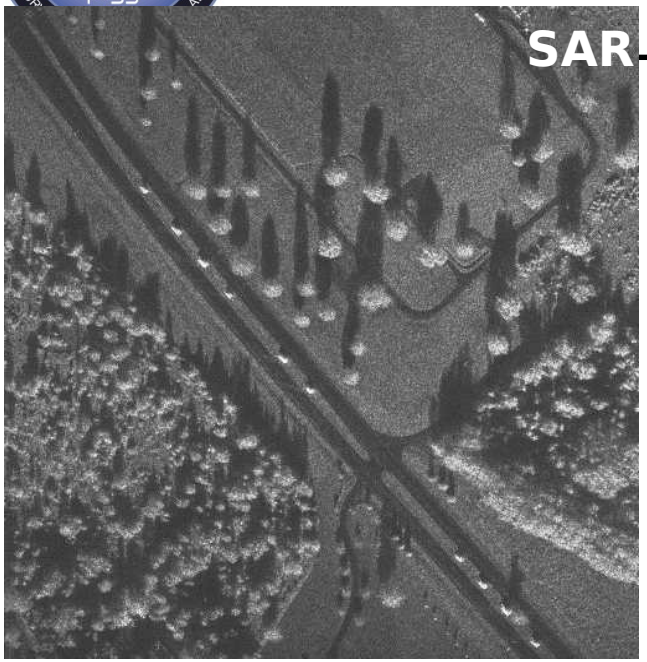
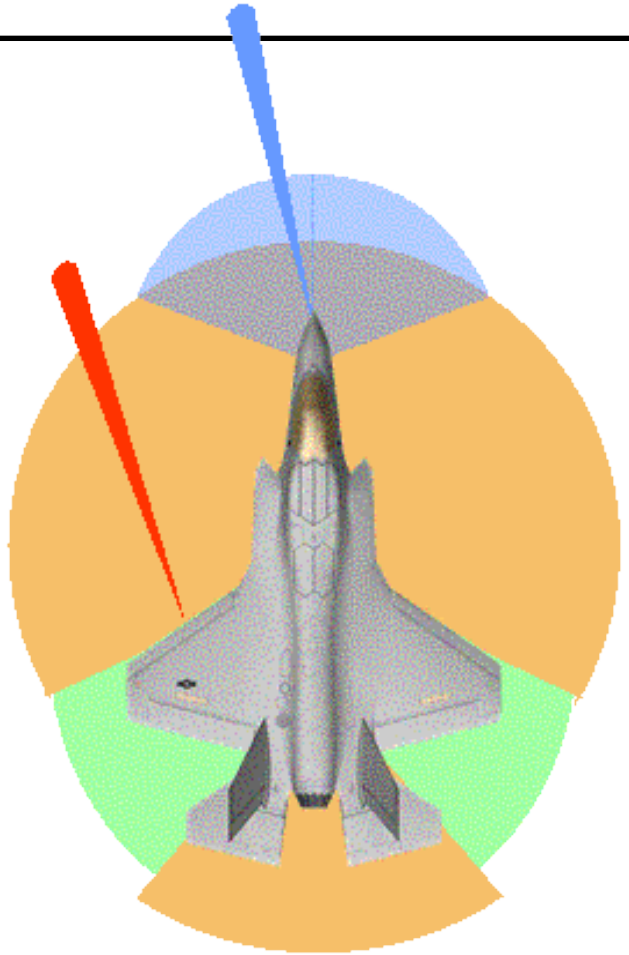
Combat Radius

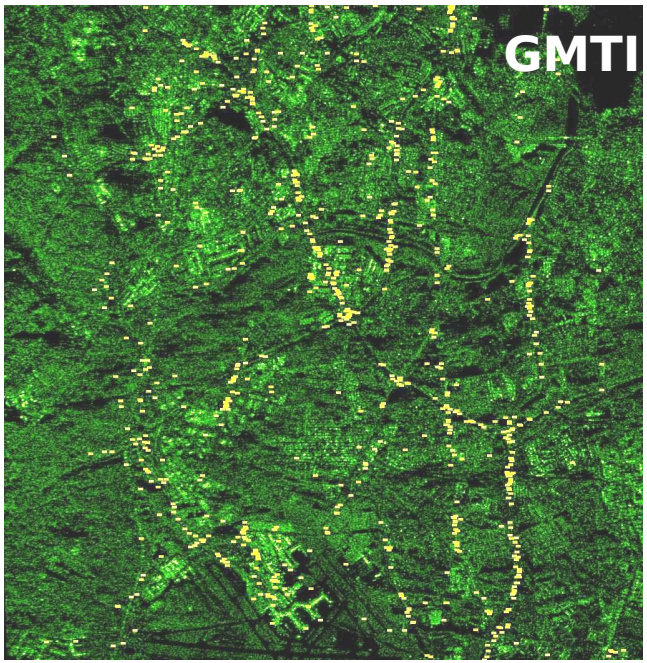


DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

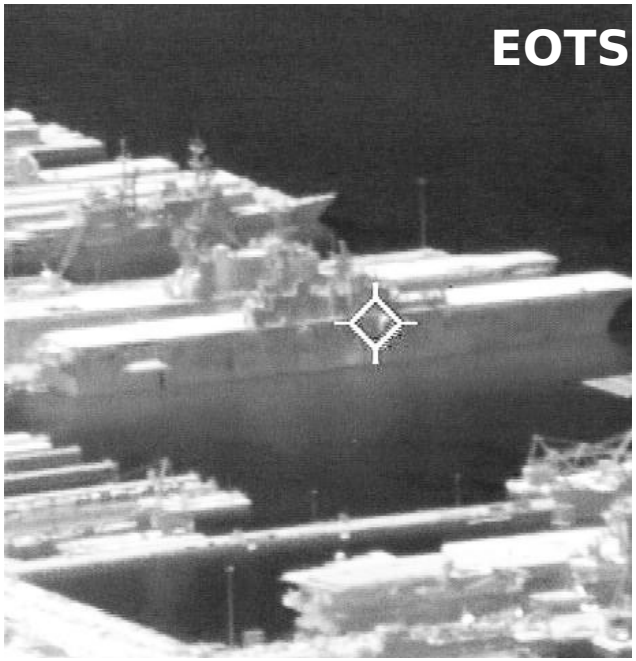
F-35 Baseline Mission Systems Review







- **Link 16**
- **Integrated Broadcast System**
- **UHF Satcom**
- **SINCGARS**
- **Have Quick**



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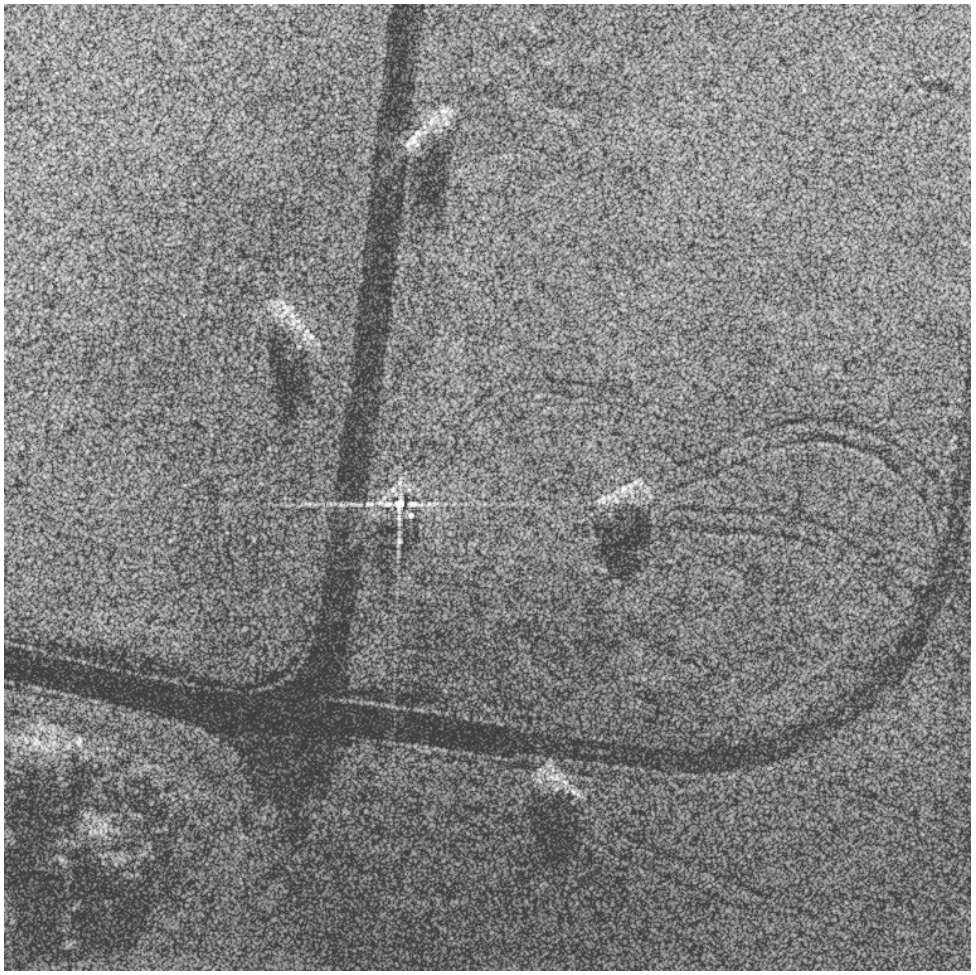
Airfield Targets

Legacy Capability

JSF Capability



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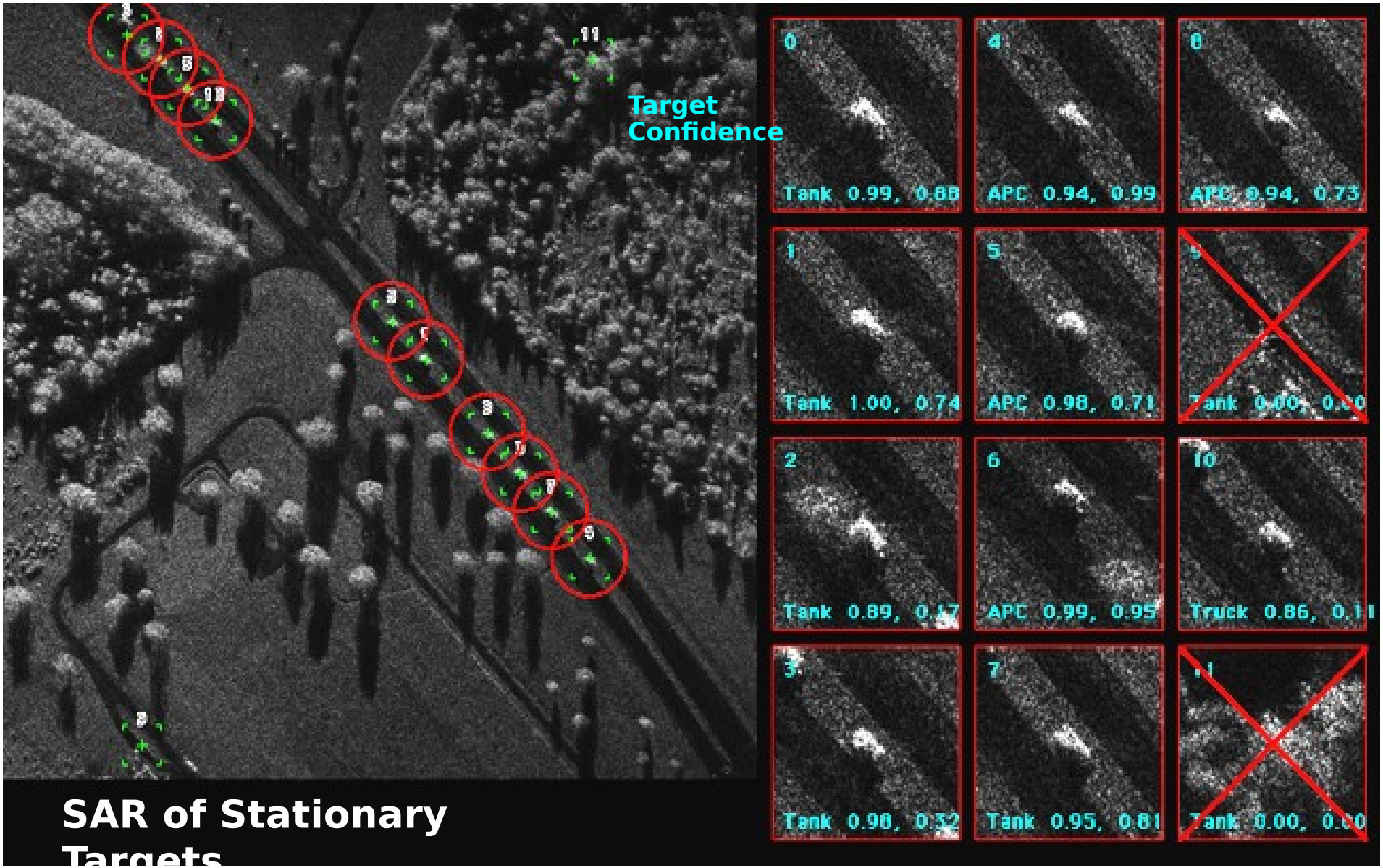
AESA Synthetic Aperture Radar Targeting (U)

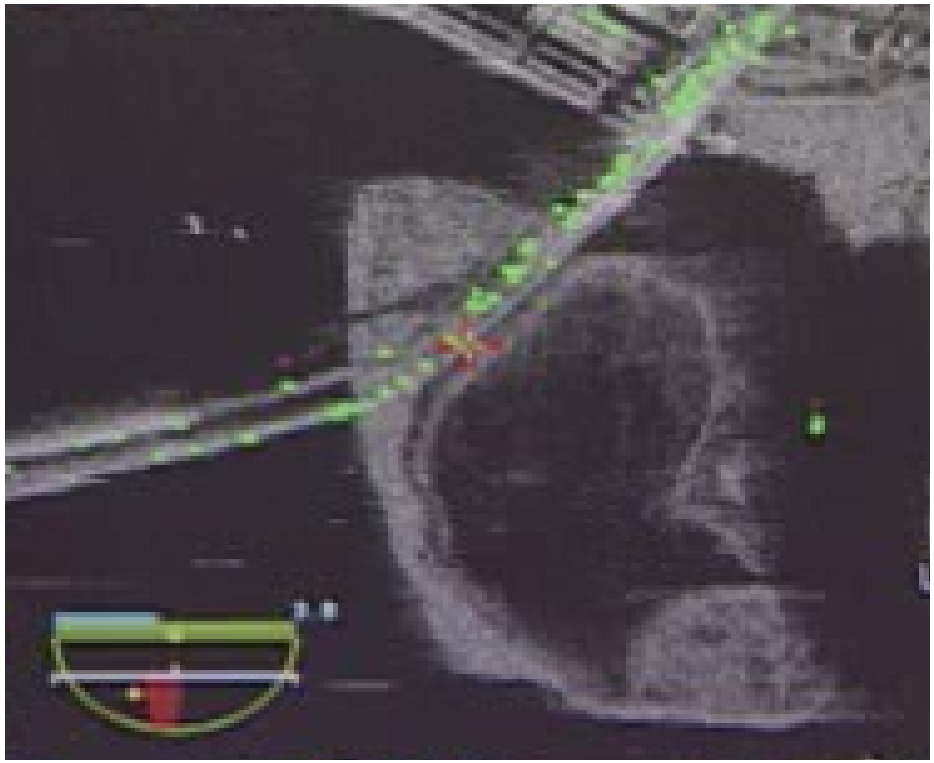


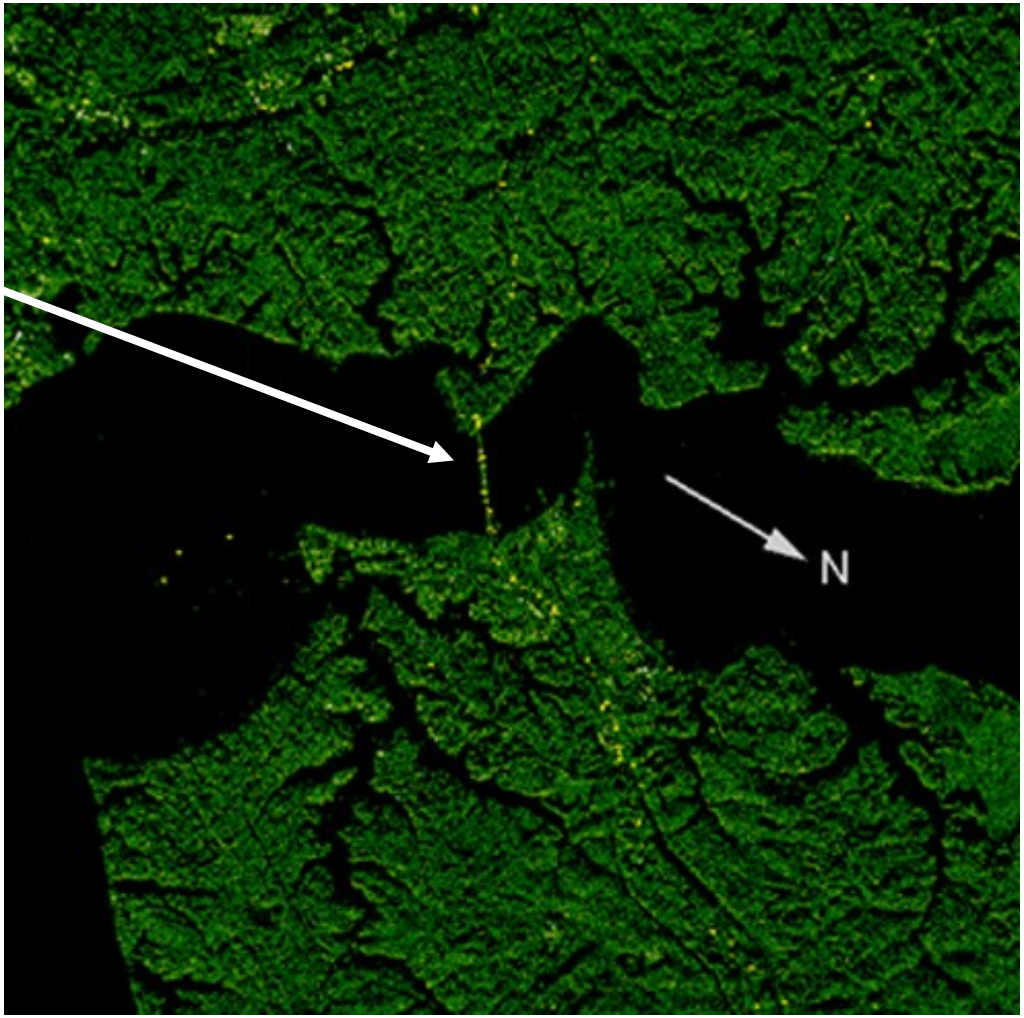
SAR of Stationary Targets

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

Ground Moving Target Indication

Moving Targets – Overlaid on a Big SAR Map (Reduced Resolution)





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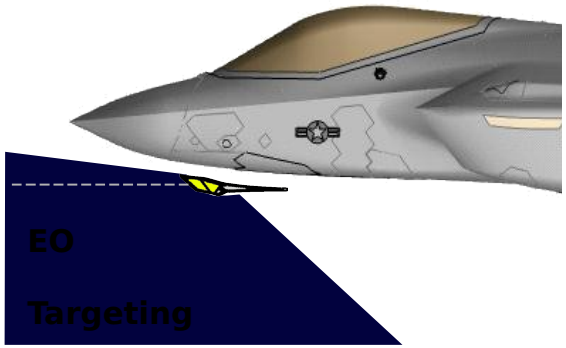
Electro-Optical Targeting System



System

- Internally Mounted
- Long Range, High Resolution
- NAVFLIR, Targeting FLIR, IRST Functions
- Digital Continuous Zoo

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

EOTS

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

Distributed Aperture System

- **Internally Mounted**
- **Missile Launch Detection**
- **Threat Aircraft Detection**
- **Track Wingman**
- **NAVFLIR Functions**
- **Integrated With HMD**

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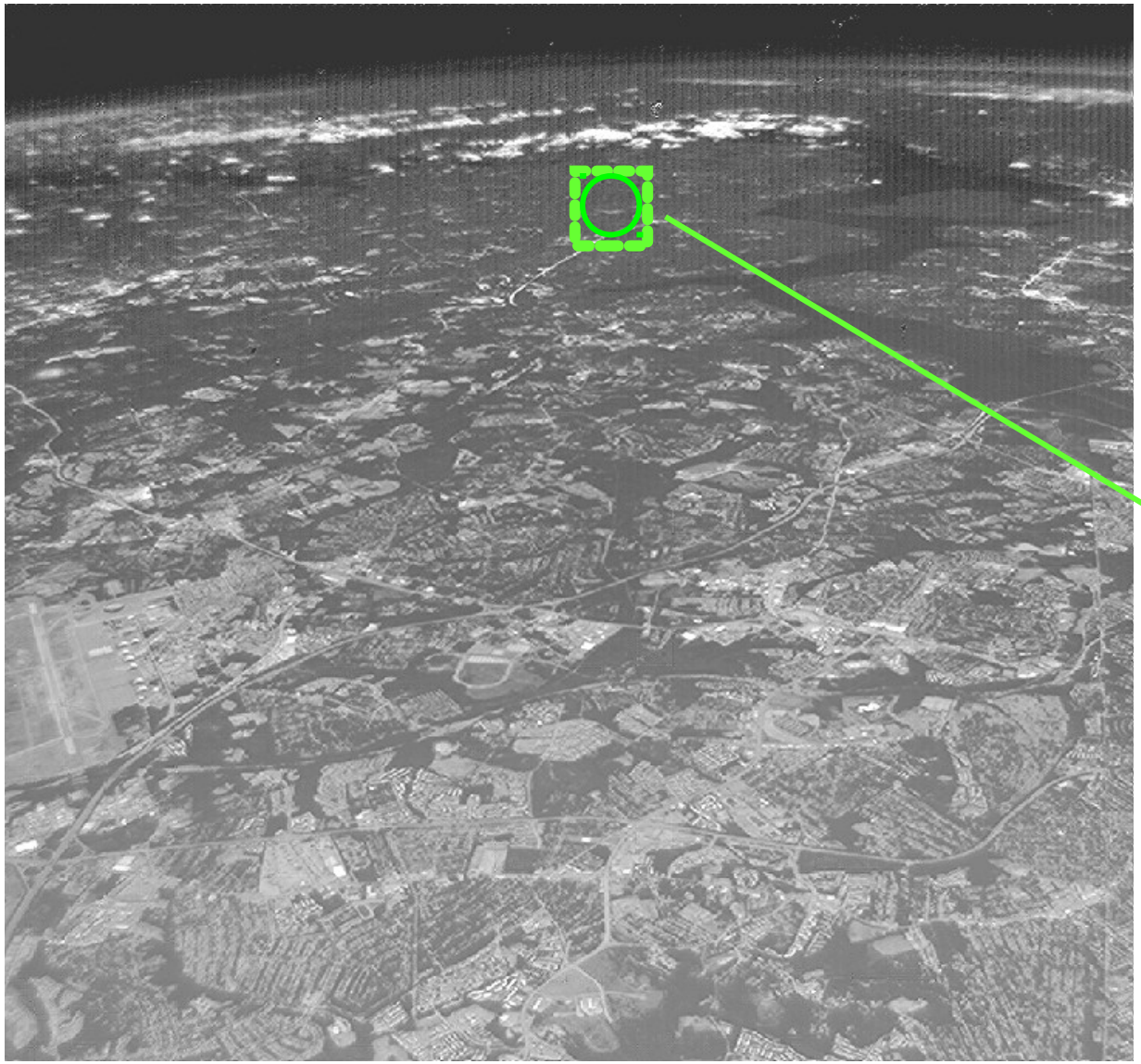
DAS and EOTS Complementary Targeting

DAS



EOTS

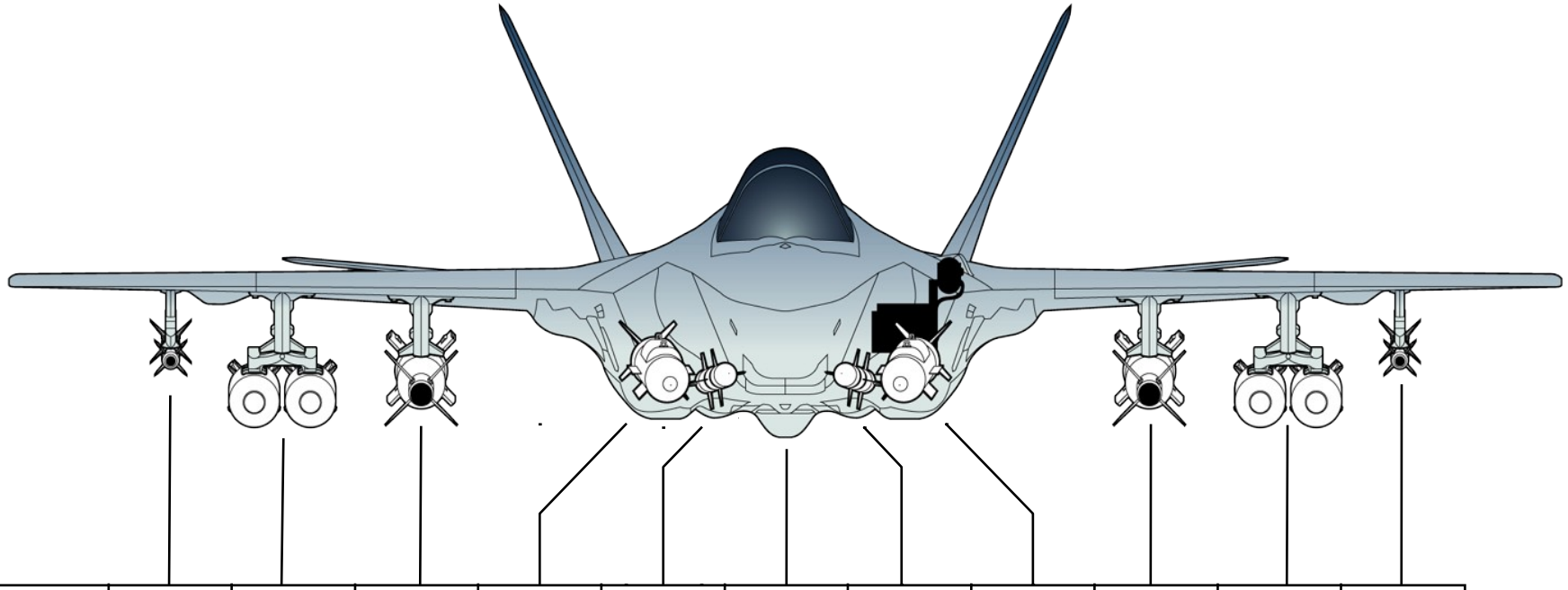
DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

Crew Station

E[redacted]s

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

Weapons Stations

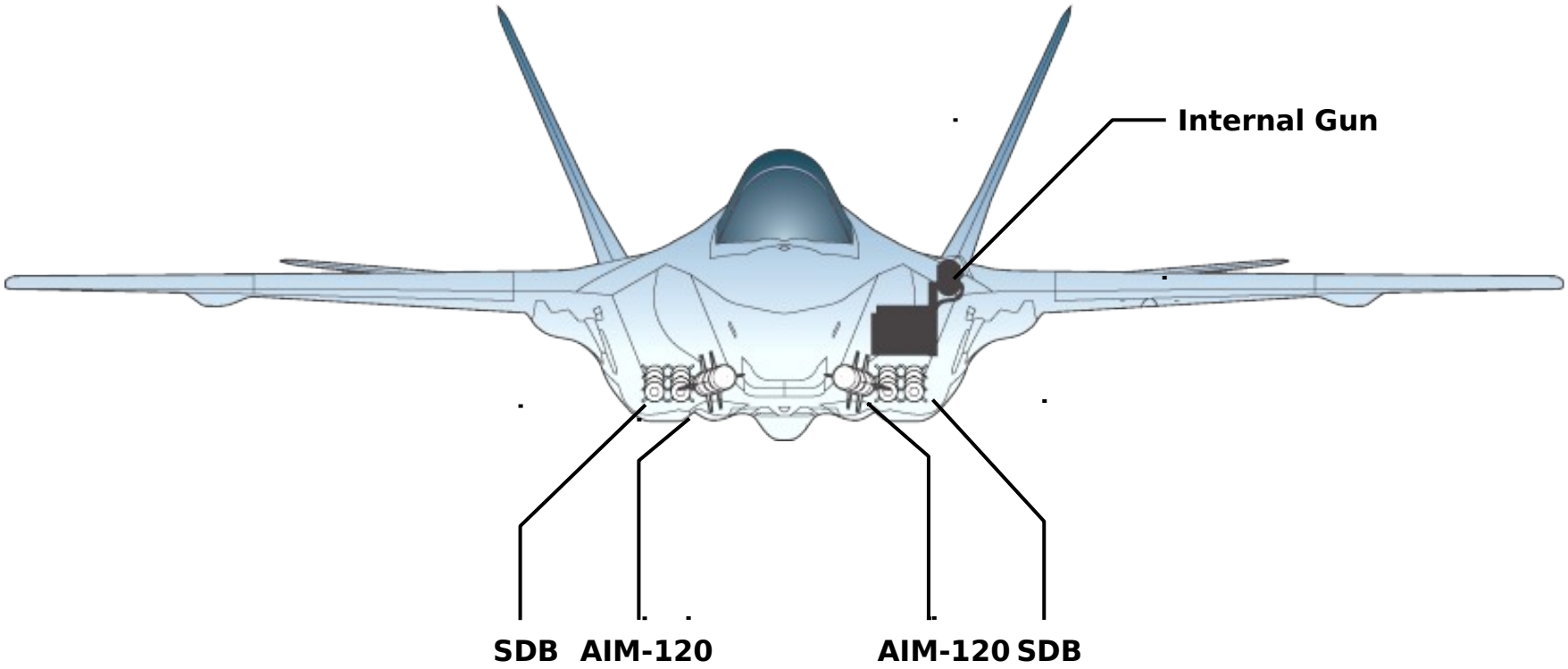


Station	11	10	9	8	7	6	5	4	3	2	1
Store	A/A	A/A, A/S	A/A, A/S	A/A, A/S	A/A	A/S	A/A	A/A, A/S	A/A, A/S	A/A, A/S	A/A
Weight	300	2,500	5,000	2,500	350	1,000	350	2,500	5,000	2,500	300

- **Over 18,000 Lbs Ordnance Capacity**
- **Nonpyrotechnic Suspension and Release**

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

Internal Weapons Load



- **Stealth Weapons Configuration**
- **8 Small Diameter Bombs**
- **180 25mm**

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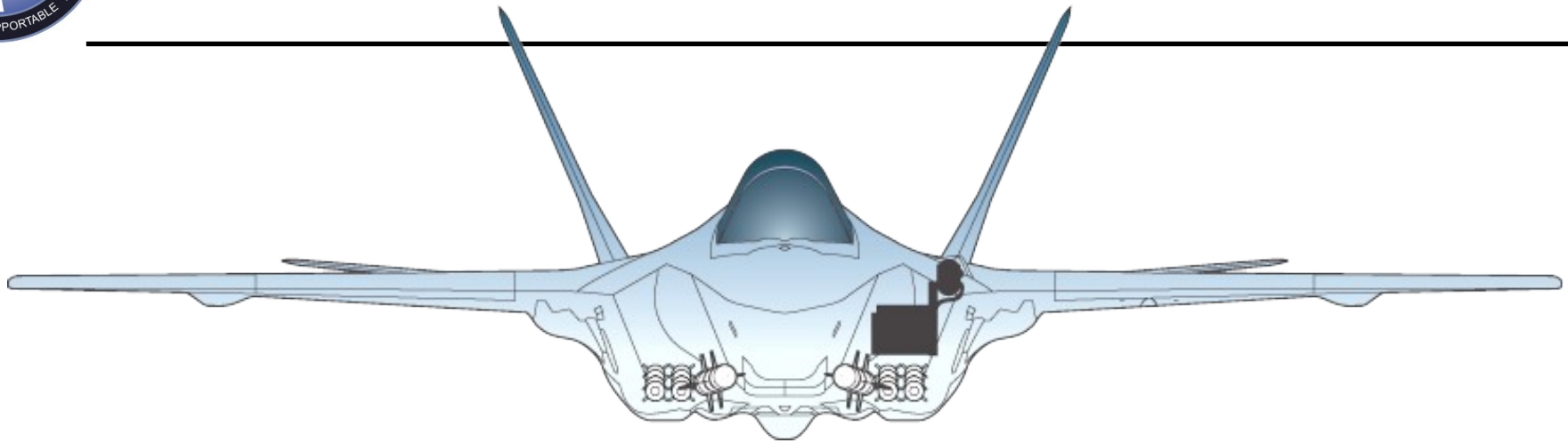
Internal Weapons Load



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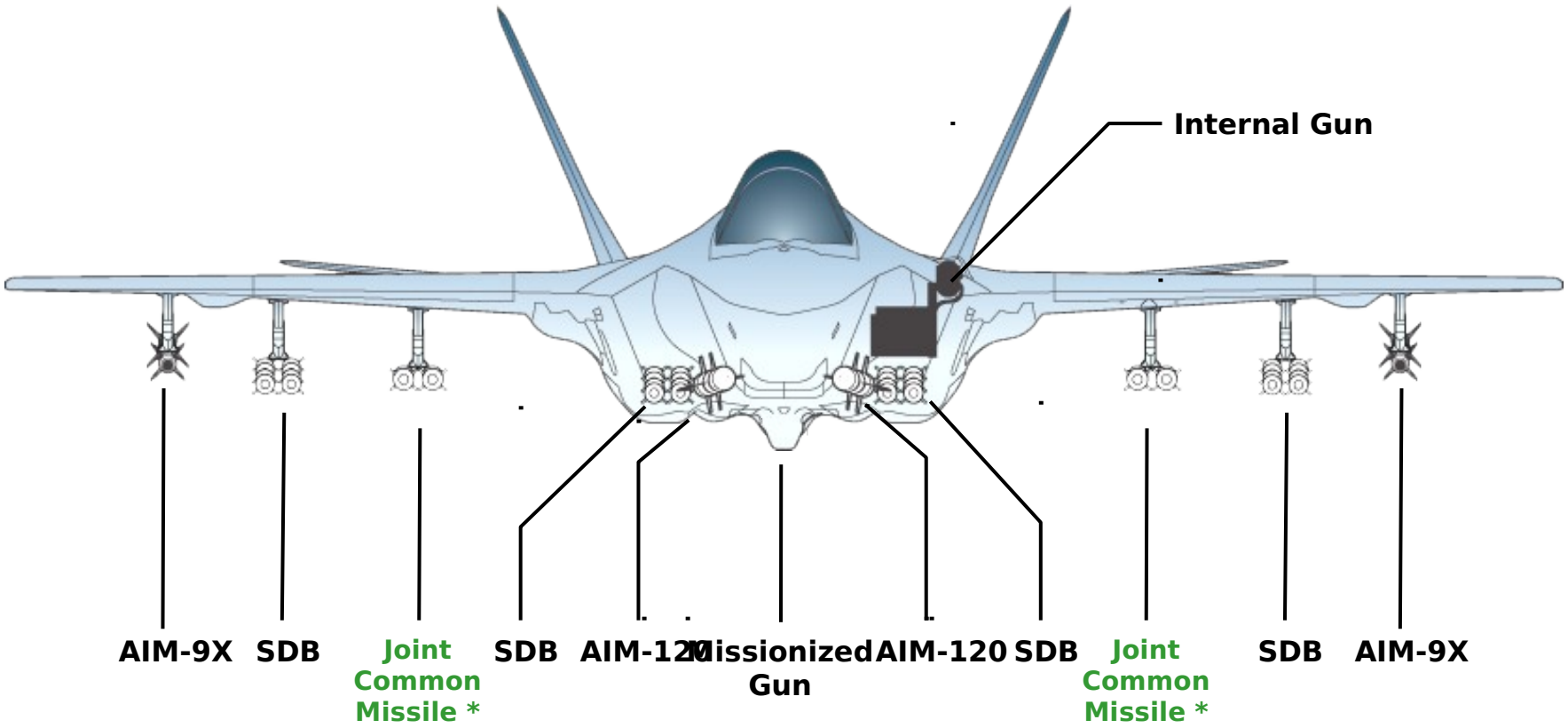
External Weapons Load



- 16 Small Diameter Bombs
- 4 Joint Common Missiles
- 220 25mm

* Under Development

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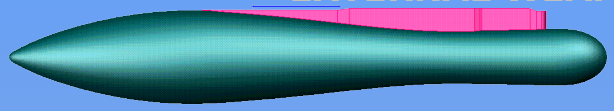
Weapons Carriage Requirements

CTOL Internal Gun

Store Fully Certified During S

EXTERNAL WEAPONS



426 -Gallon Wing Tank

Stormshadow

AGM-158 JASSM

MXU-648/CNU-88 Baggage Pod

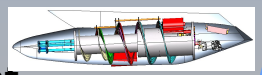
AIM-120C AMRAAM

AIM-120B AMRAAM

AIM-9X Sidewinder

BDU-57/58/60
Laser-Guided Training Round

Brimstone/Joint
Common Missile



Missionized Gun

INTERNAL AND EXTERNAL WEAPONS

GBU-32 JDAM 1,000-lb
(MK-83/BLU-110 Warhead)

GBU-12 Paveway II 500-lb LGB
(MK-82 Warhead)

GBU-31 JDAM 2,000-lb
(MK-84 Warhead)

AGM-154A/C JSOW Glide Bomb

CBU-103/104/105 WCMD

GBU-38 JDAM 500-lb
(MK-82 Warhead)

Brimstone

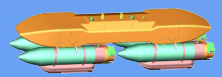
GBU-31 JDAM 2,000-lb
(BLU-109 Warhead)

AIM-120C AMRAAM

AIM-132 ASRAAM

Weapons Currently Under Development

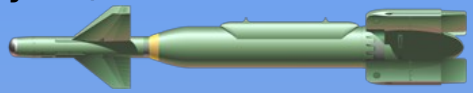
UK 500# PGB



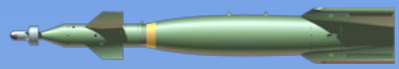
Phase I SDB

EXTERNAL WEAPONS

GBU-10 Paveway II 2,000-lb LGB (MK-84 Warhead)



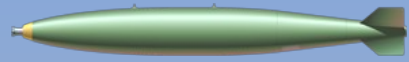
GBU-24/B Paveway III 2,000-lb LGB (MK-84 / BLU-109 War



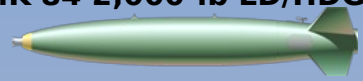
GBU-16 Paveway II 1,000-lb LGB (MK-83 Warhead)

MK-83 BLU-110 LDGP 1,000-lb LDGP

MK-83 BSU-85 HDGP



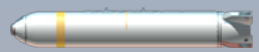
MK-84 2,000-lb LD/HDGP



MK-84 BSU-50 Ballute 2,000-lb HDGP

GBU-12 Paveway II 500-lb LGB
(MK-82 Warhead)

MK-82 500-lb LD & HD



CBU-99/100 Rockeye II
Cluster Munition

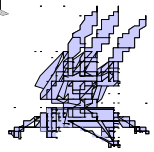
DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

Envisioned Voice and Datalinks Interoperability

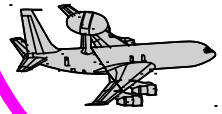
Link - 16
Aviation & Air Defense Assets

F-16

F/A-18

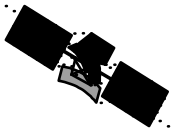

Blue SAMs

AWACs



E-2

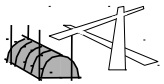
Beyond Line of Sight


SATCOM

Intra/Inter-Flight
Data Link

PHM
Datalink

CV


Air Base

LHA/LHD

Joint Tactical Radio System (JTRS)
Functionality
Joint Variable Message Format
JVMF

Ground Forces

Over 120 Information Exchange Requirements to Ensu
Interoperability Across US and Coalition Forces

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

JSF a Key Node in the System of Systems

Communications

- VHF Lo-FM (30-88 MHz)
- VHF AM (108-156 MHz)
- VHF Hi-FM (136-174 MHz)
- UHF AM (225-400 MHz)
- UHF FM (225-400 MHz)
- HAVEQUICK
- SATURN
- SINCGARS
- GUARD Monitor (243/121.5)
- KY-58 Secure Voice
- SATCOM Secure Voice
- 8.33 KHz Channelization
- Survival Radio Comm

Audio Functions

- Voice Messaging
- Voice Recognition (Support)
- Air Refuel Intercom (CTOL)
- Maintenance Intercom
- 3-D Audio
- Voice Synthesis

Identification/Surveillance

- Mark XII Transponder
- Mark XII Interrogator

Navigation/Landing Aids

- INS
- GPS
- Radar Altimeter
- ILS Marker Beacon
- ILS Glideslope
- ILS Localizer
- TACAN
- ICLS
- MLS
- JPALS

Data Communications

- Data Link
- UHF SATCOM
- Digital Battlefield
- JTCTS

Data Message Formats

- TADIL-J
- JVMF / VMF (K-series)
- TADIL-C (partial)
- TACFIRE
- AFAPD

Over 120 Information Exchange Requirements to Ensu
Interoperability Across US and Coalition Forces

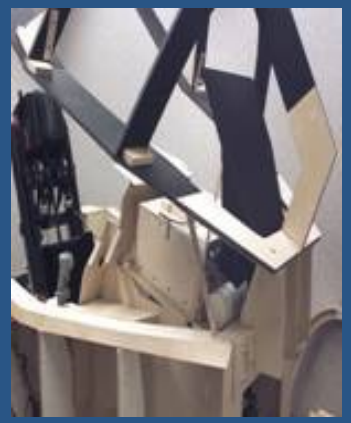
DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

Block 0.1 MS Development

"Photographs not

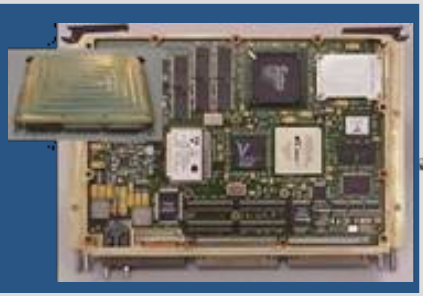
Cockpit

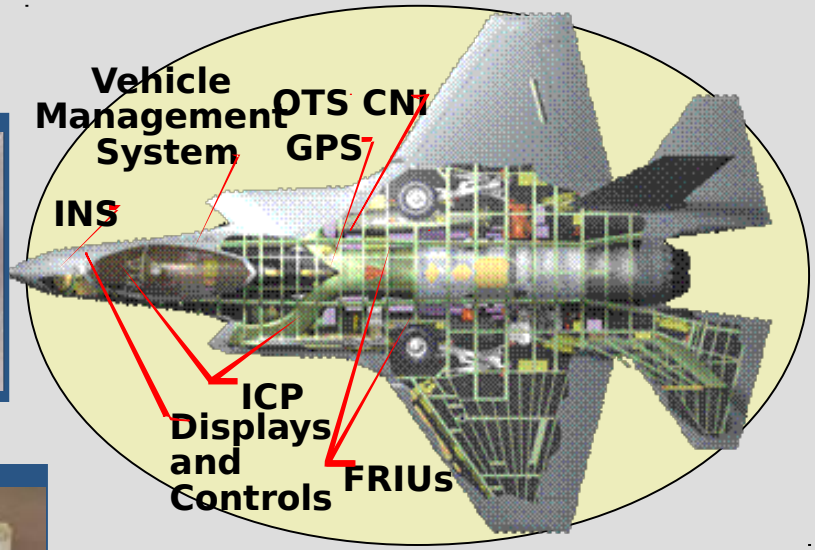
- DMC BB Testing
- Escape System Sled
- Helmet Fit Check
- HMD Flight Evaluati
- Cockpit Mockup



ICP

GPIO





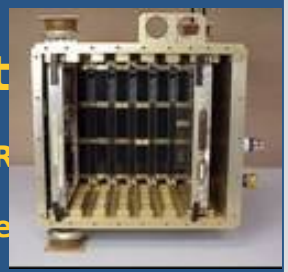
CNI

- AIA
- Radios
- RALT
- ILS
- IFFT
- APU
- Antenna Switches

Common Component

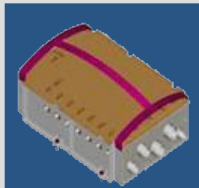
S

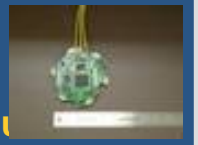
- 8Slot Integrated R
- PSA
- 6,000 Parts Delive



GPS

- GPS LR





INS

- IMU/1394 NI

Fire Control

- Pneumatic BR
  with cover

Proto FRIU

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

Block 0.2 MS Development

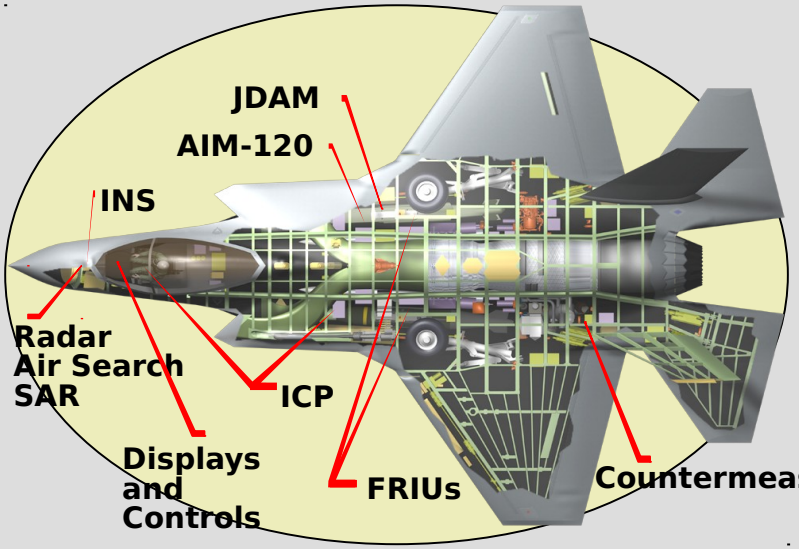
MS First Flight Emerging!

RADAR

- Multi-Function Antenna (MFA)
- RF Support Electronics (RFSE) Rack 1A
- First JSF Radiator
- Sensor FTB

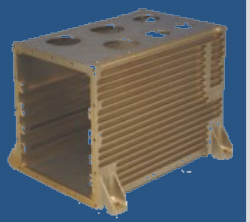
ICP

- SP/SPIO



FRIU

- Fuselage Remote Interface Unit (FRIU)



- Weapons Mockup/Weapons Loading Evaluation

MSIL

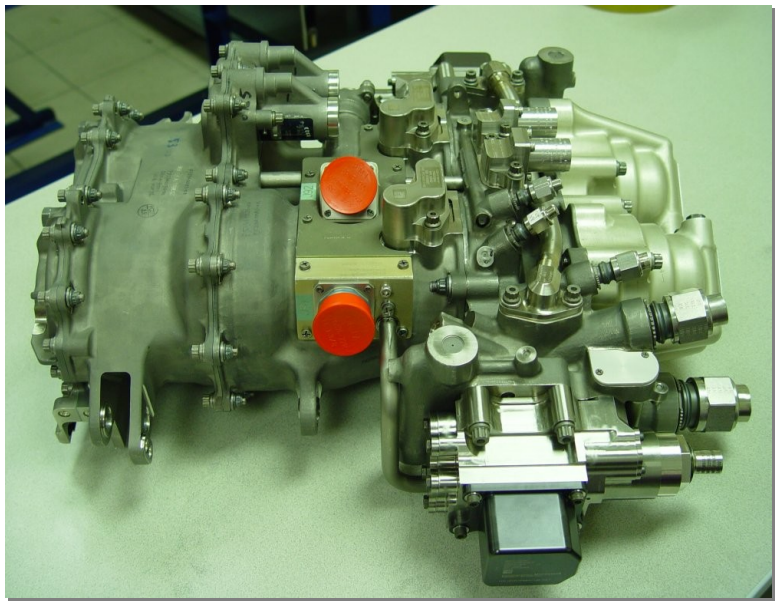
CATB

EW

- Counter Measures Contr
- IRCM Dispenser

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

Hardware Development Progress



3BSM Bearing #1 Actuator

FETT in Afterburner

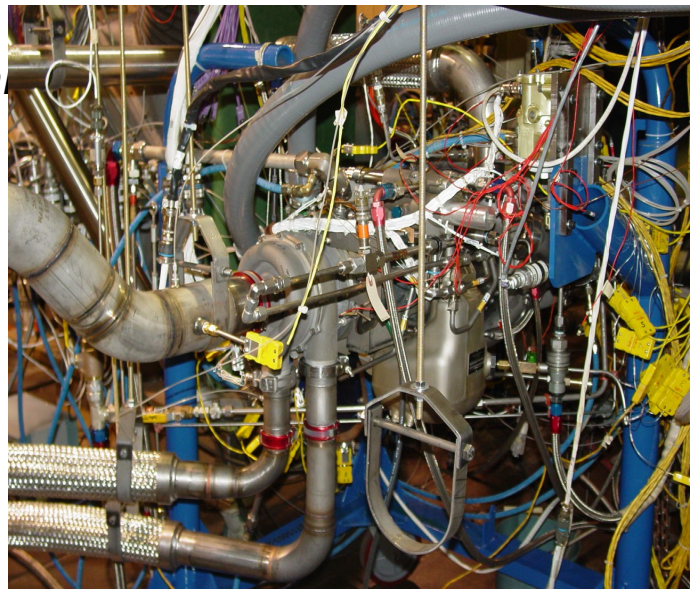
Static Inlet Model Ready to Test

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

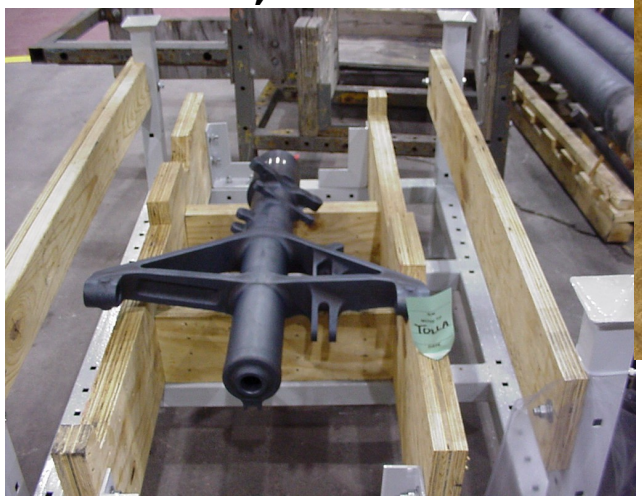
Hardware Development Progress

Fuel System Simulator - FSS

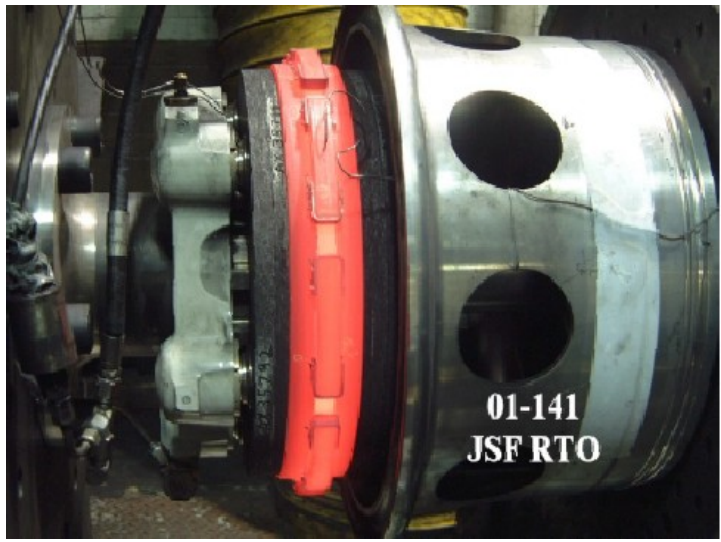
(PTMS) Turbomach



Nose Landing Gear Rough Cut Completed January 7, 2004



Refused Takeoff Brake Testi



DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

PMM - Structures Machine

- **OML Control Through Machining of Understructure OML Surfaces**
- **5 Month Assy Span Enabler**

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

Automated Wing Carry Through Drilling System

- **Single-Pass Drilling and Countersinking**
- **5 Month Assembly Span Enabler**

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

Robotic Component Finishing System (RCFS)

- **Automated Coating Application**
- **Minimizes Re-Work and Coating Weight – 1 extra mil = ~30lbs**
- **Achieves Quality Through Automated Process**

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

Getting There…

- **Truly Expeditionary…**
  - **World's Most Versatile/Adaptable/Lean Fighter Deployment Package**
    - **Significantly Less Logistic Support Required…**
      - **Significantly Less Airlift Required**
        - **24 F-16 Package = 13 C-17 (For Initial 30 Days)**
        - **24 F-35 Package = <8 C-17**

Rapid Arrival of Airborne Fire Support with Ground Forces

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

JSF Autonomic Logistics System

Highly Supportable Aircraft

- Smart / Reliable Design
- Prognostics and Health Management
- Remove and Replace (R/R) Maintenance
- On Condition Maintenance

Training System

- Integrated Training
- Embedded Pilot Training
- On Demand Maintenance Training
- Air Vehicle Software Reuse

Support System

- Sustaining Engineering
  - 24/7 Help Desk
- Electronic Joint-Service Tech Data
- Intelligent Maintenance Management
- Global Supply Chain Insight
- Support Equipment Management

Autonomic Logistics Information System

- Distributed Information System
- Enterprise Resource Solution
- Secure
- Scalable

Autonomic Logistics Provides Order Of Magnitude O&S S

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

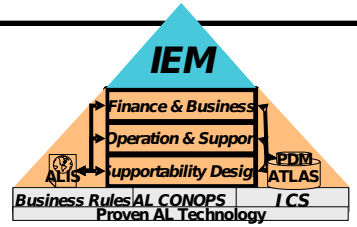
AL Accomplishments

AutoLog Lab (ALL)

- *3 Labs Up and Running*
- *Located in FtW and Orlando*

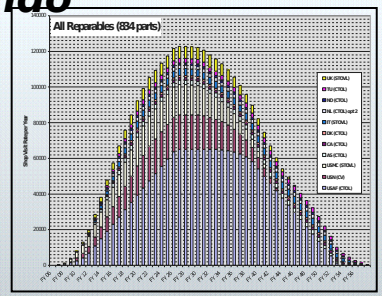
Strategic Business

- *Draft Strategic Plan*
- *Business Case Analysis*



SEM

- *Tool is Available*
- *Produces Analysis Products*
- *Maturation is Ongoing*



Depot Repairables

- *Depot WG Established*
- *Depot Capability Design Demo*
- *Depot Architecture Review*
- *Depot Requirements Integration Planning*

Verification Planning

- *106 Direct JCS AL Rqmt's*
  - *4 OEM Demo*
  - *45 M&S*
  - *51 Lab Test/Demo*
  - *4 On A/C*
  - *2 Flt Test*

Engine Integration

- *Panel Fastener Count Reduced On Several Panels*
- *Maintainer Access Improved Through Redesign of Several Access Panels*

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

JSF Transformational Capabilities

Replacing Separate Service/Allied, Multi-Role Combat Aircraft With a Joint Service, Coalition System With the Following Capabilities:

- Long Range Stealth From Flexible Bases
- Multi-Spectral Sensor Suite to Find, Identify and Target Moving/Relocatable Targets Through Adverse Weather
- Integration and Interoperability Adding to Precision Strike
- Radical Reductions in Support Requirements and Ownership Costs

Transforming From Service-Focused Acquisition to Joint/Coalition Acquisition

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

IAW RDML E email on "Commander's Intent"

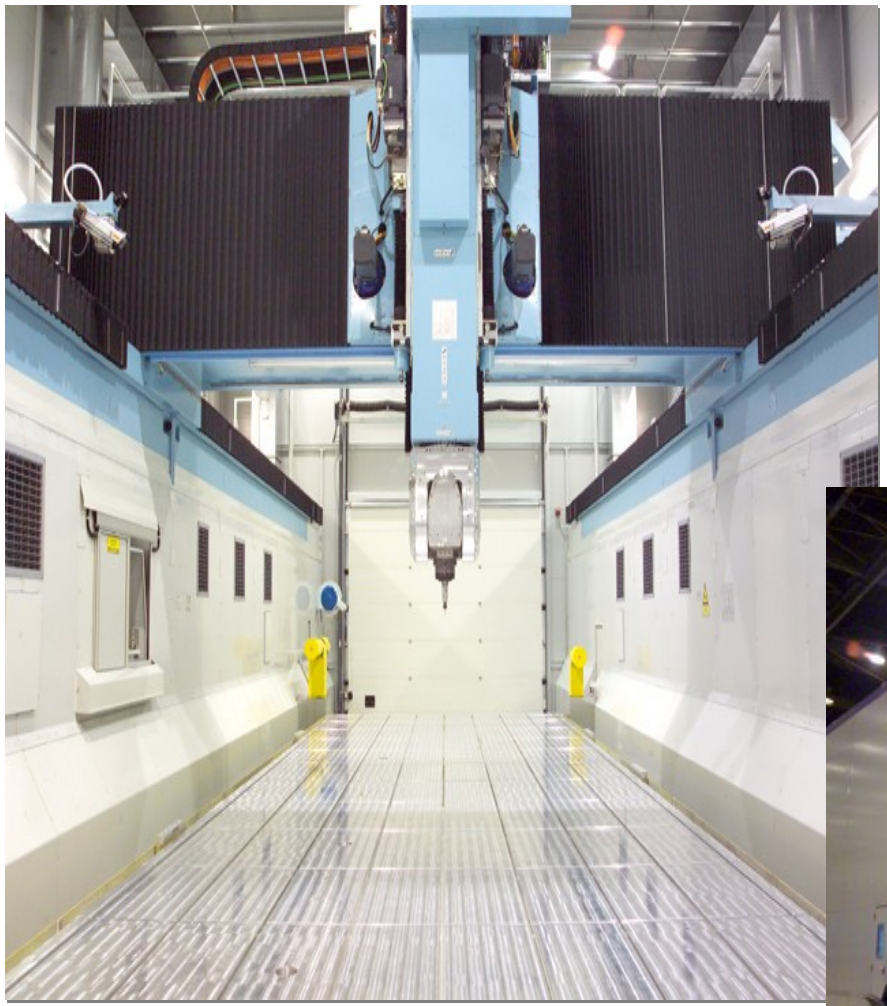
VISION

BE THE MODEL ACQUISITION PROGRAM FOR JOINT SERVICE AND INTERNATIONAL COOPERATION.

DELIVER TO OUR WAR FIGHTERS AN AFFORDABLE AND EFFECTIVE NEXT GENERATION STRIKE FIGHTER WEAPON SYSTEM AND SUSTAIN IT WORLDWIDE.

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

Flexible Overhead Gantry (FOG) Machine

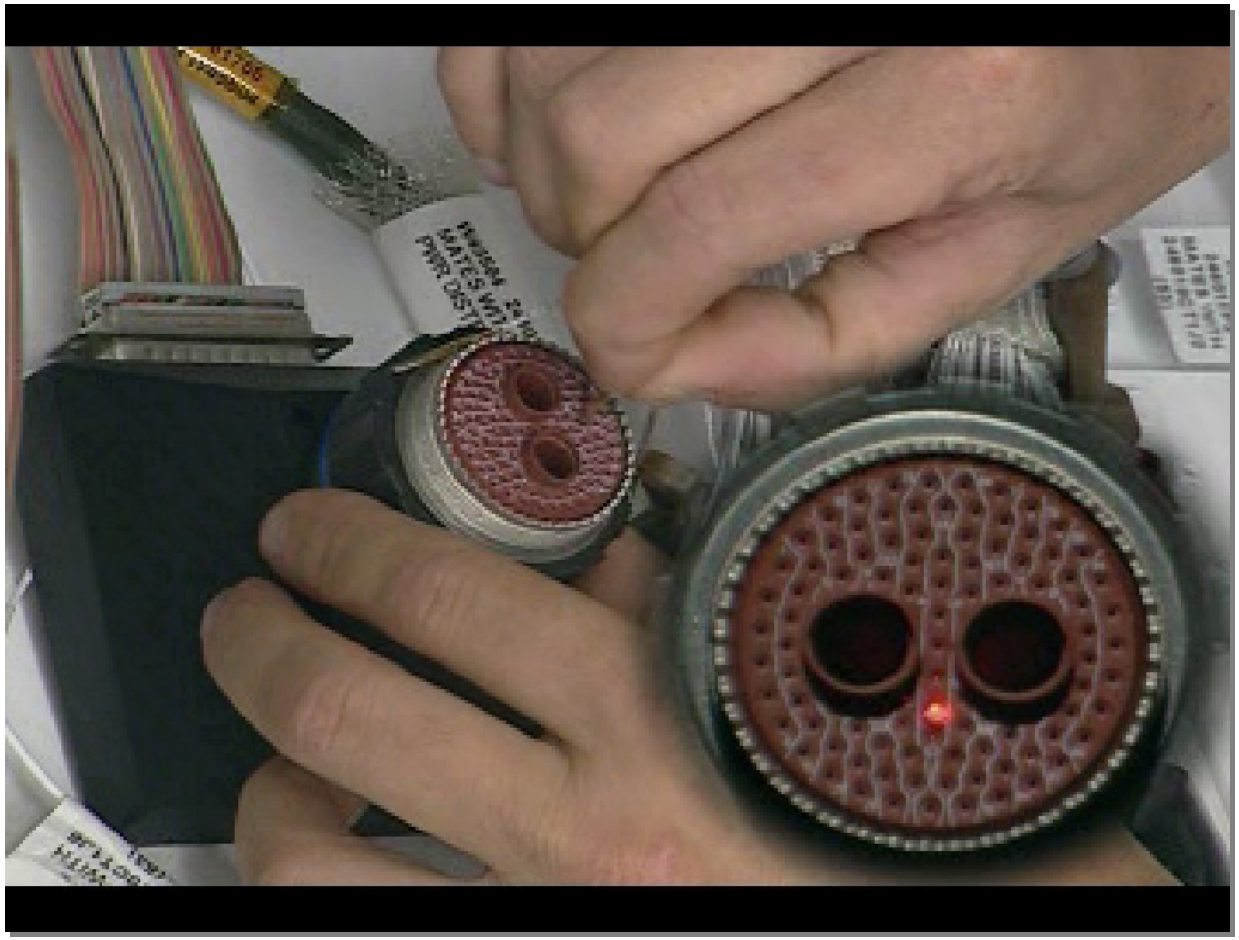


- F-35 OML Control Through Machining of IML Surfaces (Laminate Thickness Control)
- Fixed Skin and Removable Panel Thickness Control
- 5 Month Assembly Span Enabler

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

Connector Light Array Designator System - C.L.A.D.S.

- **Improve Accuracy and Speed of Pinning Operations**
- **Reduce Assembly Span Time**
- **Improve Quality**



DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

Bulkhead Marking System

- **Eliminate Assembly Templates**
- **Initial Cost Avoidance Through Elimination of Assembly Tools**
- **Machine Data Provided by Digital Thread**

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

Automated FWD Fuselage Cockpit Side Panel Drilling System

- **Single-Pass Drilling and Countersinking**
- **5 Month Assembly Span Enabler**

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.